PRELIMINARY ASSESSMENT

128th Tactical Fighter Wing
Wisconsin Air National Guard
Truax Field
Madison, Wisconsin

HAZWRAP SUPPORT CONTRACTOR OFFICE
Oak Ridge, Tennessee 37831
Operated by MARTIN MARIETTA ENERGY SYSTEMS, INC.
For the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-840R21400

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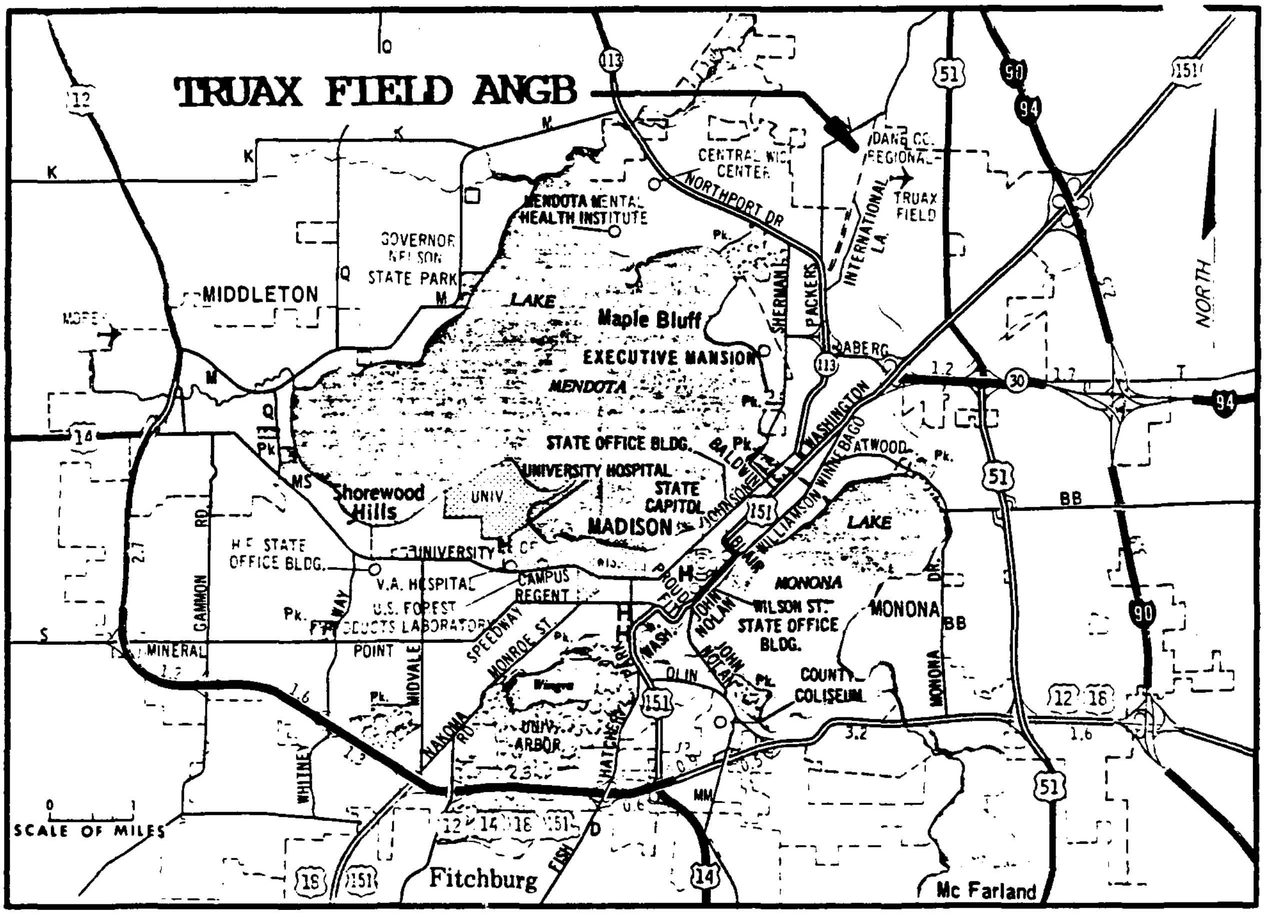

MADISON

AND VICINITY

Source: Official State Highway Map, Wisconsin Dept. of Transportation, 1986

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704-0188

1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
August 1988

3. REPORT TYPE AND DATES COVERED
Preliminary Assessment Final

4. TITLE AND SUBTITLE
Installation Restoration Program
Preliminary Assessment
Headquarters, 128th Tactical Fighter Wing
Wisconsin Air National Guard Truax Field
Madison, Wisconsin.

5. FUNDING NUMBERS

6. AUTHOR(S)
N/A

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
PEER Consultants, P.C.
575 Oak Ridge Turnpike
Oakridge, Tennessee 37830

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Air National Guard Bureau
Andrews Air Force Base, Maryland 20331

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release
Distribution is unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

Preliminary Assessment on any suspected hazardous waste sites on Truax Field, Wisconsin Air National Guard.

14. SUBJECT TERMS
Installation Restoration Program
Preliminary Assessment
Wisconsin Air National Guard, Truax Field

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT

INSTALLATION RESTORATION PROGRAM
PRELIMINARY ASSESSMENT

HEADQUARTERS, 128TH TACTICAL FIGHTER WING
WISCONSIN AIR NATIONAL GUARD
TRUAX FIELD
MADISON, WISCONSIN

August 1988

Prepared for

National Guard Bureau
Andrews Air Force Base, Maryland 20331-6008

Prepared by

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Interagency Agreement No. 1489-1489-A1

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EXECUTIVE SUMMARY

A. INTRODUCTION

PEER Consultants, P.C., was retained by the Hazardous Waste Remedial Actions Program (HAZWRAP) Support Contractor Office in January 1988 to conduct an Installation Restoration Program (IRP) Preliminary Assessment of the 128th Tactical Fighter Wing (TFW), Wisconsin Air National Guard, Truax Field, Madison, Wisconsin [hereinafter referred to as the Air National Guard Base (ANGB) or the Base], under Contract No. DE-AC05-840R21400. The Preliminary Assessment included:

- an on-site visit, including interviews with 19 ANGB employees conducted by PEER personnel January 18-22, 1988;

- the acquisition and analysis of pertinent information and records on past hazardous materials use and past hazardous wastes generation and disposal at the ANGB;

- the acquisition and analysis of available geologic, hydrologic, meteorologic, and environmental data from pertinent federal, state, and local agencies; and

- the identification of potential sites on the ANGB that may be contaminated with hazardous materials/hazardous wastes.

B. MAJOR FINDINGS

The major operations of the 128th TFW that have used and disposed of hazardous materials/hazardous wastes include aircraft maintenance, ground vehicle maintenance, aerospace ground equipment, and fire department training. The operations involve such activities as corrosion control, nondestructive inspection, fuel cell maintenance, and engine maintenance. Varying quantities of waste oils, recovered fuels, spent cleaners, strippers, and solvents were generated and disposed of by these activities.

Interviews with 19 ANGB personnel having an average of 24 years' experience each, analysis of pertinent information and records, and a field survey resulted in the identification of three potential disposal/spill/storage sites on the ANGB. The identified sites are as follows:

- Site No. 1 - JP-4 Fuel Spill No. 1 (unrated)
- Site No. 2 - JP-4 Fuel Spill No. 2 (unrated)
- Site No. 3 - PCB Spill (unrated)

C. CONCLUSIONS

After careful evaluation, the three identified sites have been considered to have no significant potential for contamination and/or migration and pose no significant threat to the environment and public health.

D. RECOMMENDATIONS

Based upon the findings of this report, it is recommended that the three identified potential disposal/spill/storage sites be deleted from further IRP evaluation. The implementation of Decision Documents based on the findings of this report are recommended for the three sites to delete them from further IRP evaluation.

I. INTRODUCTION

A. BACKGROUND

The 128th Tactical Fighter Wing (TFW), Wisconsin Air National Guard (ANG), is located at the Dane County Regional Airport/Truax Field, Madison, Wisconsin. The ANG Base (ANGB) has been in service since 1942 and over the years the types of military aircraft based and serviced there have varied. Both past and present operations have involved use of hazardous materials and disposal of hazardous wastes. Because of the use of hazardous materials and disposal of hazardous wastes, the ANG has implemented its Installation Restoration Program (IRP).

THE INSTALLATION RESTORATION PROGRAM

The Department of Defense (DoD) IRP is a comprehensive program designed to:

- o Identify and fully evaluate suspected problems associated with past hazardous waste disposal and/or spill sites on DoD installations, and

- o Control hazards to human health, welfare, and the environment that may have resulted from these past practices.

During June 1980, DoD issued a Defense Environmental Quality Program Policy Memorandum (DEQPPM 80-6) requiring identification of past hazardous waste disposal sites on DoD installations. The policy was issued in response to the Resource Conservation and Recovery Act of 1976 (RCRA) and in anticipation of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA, Public Law 96-510) commonly known as "Superfund." In August 1981, the President delegated certain authority specified under CERCLA to the Secretary of Defense via Executive Order (EO 12316). As a result of EO 12316, DoD revised the IRP by issuing DEQPPM 81-5 on December 11, 1981, which reissued and amplified all previous directives and memoranda.

Although the DoD IRP and the USEPA Superfund programs were essentially the same, differences in the definition of program phases and lines of authority resulted in some confusion between DoD and state/federal regulatory agencies. These difficulties were rectified via passage of the Superfund Amendments and Reauthorization Act (SARA, PL-99-499) of 1986. On January 23, 1987, Presidential Executive Order EO 12580 was issued. EO 12580 effectively revoked EO 12316 and implemented the changes promulgated by SARA.

The most important changes effected by SARA included the following:

- Section 120 of SARA provides that federal facilities, including those in DoD, are subject to all the provisions of CERCLA/SARA concerning site assessment, evaluation under the National Contingency Plan (NCP) [40 CFR 300], listing on the National Priorities List (NPL), and removal/remedial actions. DoD must therefore comply with all the procedural and substantive requirements (guidelines, rules, regulations, and criteria) promulgated by the USEPA under Superfund authority.

- Section 211 of SARA also provides continuing statutory authority for DoD to conduct its IRP as part of the Defense Environmental Restoration Program (DERP). This was accomplished by adding Chapter 160, Sections 2701-2707 to Title 10 United States Code (10 USC 160).

- SARA also stipulated that terminology used to describe or otherwise identify actions carried out under the IRP shall be substantially the same as the terminology of the regulations and guidelines issued by the USEPA under their Superfund authority.

As a result of SARA, the operational activities of the IRP are currently defined and described as follows:

Preliminary Assessment (PA)

The PA is a records search designed to identify and evaluate past disposal and/or spill sites which might pose a potential and/or actual hazard to public health, welfare, or the environment.

Site Investigation/Remedial Investigation/Feasibility Study (SI/RI/FS)

The SI consists of field activities designed to confirm the presence or absence of contamination at the sites identified as a result of the PA. The RI consists of field activities designed to quantify the types and extent of contamination present, including migration pathways.

If applicable, a public health evaluation is performed to analyze the collected data. Field tests are required which may necessitate the installation of monitoring wells and/or the collection and analysis of water, soil, and/or sediment samples. Careful documentation and quality control procedures, in accordance with CERCLA/SARA guidelines, ensure the validity of data. Hydrogeologic studies are conducted to determine the underlying strata, groundwater flow rates, and direction of contamination migration. The findings from these studies result in the selection of one or more of the following options:

- No further action - Investigations do not indicate harmful levels of contamination and do not pose a significant threat to human health or the environment. The site does not warrant further IRP action and a decision document will be prepared to close out the site.

- Long-term monitoring - Evaluations do not detect sufficient contamination to justify costly remedial actions. Long-term monitoring may be recommended to detect the possibility of future problems.

- Feasibility Study - Investigations confirm the presence of contamination that may pose a threat to human health and/or the environment, and some form of remedial action is indicated. The FS is therefore designed and

developed to identify and select the most appropriate remedial action. The FS may include individual sites, groups of sites, or all sites on an installation. Remedial alternatives are chosen according to engineering and cost feasibility, state/federal regulatory requirements, public health effects, and environmental impacts. The end result of the FS is the selection of the most appropriate remedial action by the ANG with concurrence by state and/or federal regulatory agencies.

Remedial Design/Remedial Action (RD/RA)

The RD involves formulation and approval of the engineering designs required to implement the selected remedial action. RA is the actual implementation of the remedial alternative. It refers to the accomplishment of measures to eliminate the hazard or, at a minimum, reduce it to an acceptable limit. Covering a landfill with an impermeable cap, pumping and treating contaminated groundwater, installing a new water distribution system, and in situ biodegradation of contaminated soils are examples of remedial measures that might be selected. In some cases, after the RAs have been completed, a long-term monitoring system may be installed as a precautionary measure to detect any contaminant migration or to document the efficiency of remediation.

Research and Development (R&D)

R&D activities are not always applicable for an IRP site, but may be necessary if there is a requirement for additional research and development of control measures. R&D tasks may be initiated for sites that cannot be characterized or controlled through the application of currently available, proven technology. It can also, in some instances, be used for sites deemed suitable for evaluating new technologies.

Immediate Action Alternatives

At any point, it may be determined that a former waste disposal site poses an immediate threat to public health or the environment, thus necessitating prompt removal of the contaminant. Immediate actions, such as limiting access to the

site, capping or removing contaminated soils and/or providing an alternate water supply may suffice as effective control measures. Sites requiring immediate removal action maintain IRP status in order to determine the need for additional remedial planning or long-term monitoring. Removal measures or other appropriate remedial actions may be implemented during any phase of an IRP project.

B. PURPOSE

The purpose of the PA is to identify and evaluate suspected problems associated with past hazardous wastes handling procedures, disposal sites, and spill sites on the ANGB and to assess the potential for the migration of hazardous contaminants. PEER Consultants, P.C., visited the ANGB, reviewed existing environmental information, analyzed the ANGB records concerning the use and generation of hazardous materials/hazardous wastes, and conducted interviews with past and present ANGB personnel who were familiar with past hazardous materials management activities. Relevant information collected and analyzed as a part of the PA included the history of the ANGB, with special emphasis on the history of the shop operations and their past hazardous materials/hazardous wastes management procedures; the local geological, hydrological, and meteorological conditions that may affect migration of contaminants; local land use, public utilities, and zoning requirements that affect the potentiality for exposure to contaminants, and the ecological settings that indicate environmentally sensitive habitats or evidence of environmental stress.

C. SCOPE

The scope of this PA is limited to the property situated within the boundaries of and property which is or has been controlled by the ANGB and included the following:

- An on-site visit;
- the acquisition of pertinent information and records on hazardous materials use and past hazardous wastes generation and disposal

practices at the ANGB in order to establish the source and characteristics of hazardous wastes or spills;

- o the acquisition of available geologic, hydrologic, meteorologic, land use and zoning, critical habitat and utility data from various federal, state, and local agencies in order to establish potential pathways and receptors of hazardous wastes or spills;
- o a review and analysis of all information obtained; and
- o the preparation of a report, to include recommendations for further actions.

The on-site visit, interviews with past and present personnel, and meetings with local agency personnel were conducted during January 18-22, 1988. The PEER PA team consisted of the following individuals (resumes are included as Appendix B):

- o Mr. Tom Webb, Senior Project Manager
- o Mr. Anthony Wagner, Geologist
- o Mr. Kevin Pack, Civil/Environmental Engineer

Individuals from the ANGB who assisted in the Preliminary Assessment include CMSgt Ray Steinich, Facility Manager, and selected members of the 128th TFW. The Headquarters Air National Guard Support Center (ANGSC) Project Officer for Truax Field ANGB was Mr. Hank Lowman of ANGSC/DER.

D. METHODOLOGY

A flowchart of the PA methodology is presented in Figure IA. This PA methodology ensures, to the greatest extent possible, a comprehensive collection and review of pertinent site-specific information, and is used in the identification and assessment of potentially contaminated hazardous wastes spill/disposal sites.

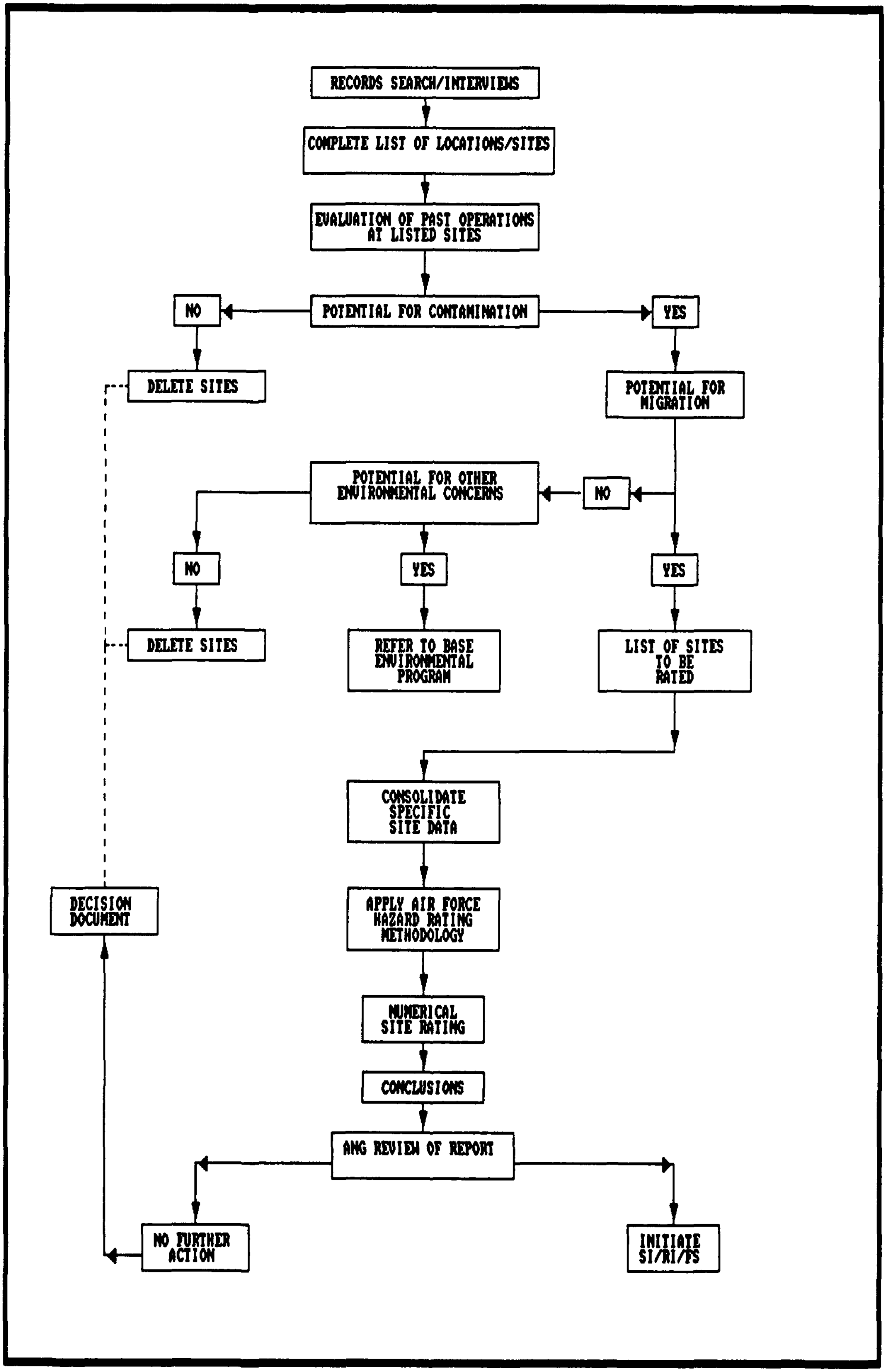

FIGURE IA. PRELIMINARY ASSESSMENT METHODOLOGY FLOWCHART, 128th TFW, WISCONSIN ANG, TRUAX FIELD, MADISON, WISCONSIN

The PA began with a site visit to the ANGB to identify all shop operations or activities that may have used hazardous materials or generated hazardous wastes. Next, an evaluation of past and present hazardous materials/hazardous wastes handling procedures at the identified locations was made to determine whether environmental contamination may have occurred. The evaluation of past hazardous materials/hazardous wastes handling practices was facilitated by extensive interviews with 19 past and present employees familiar with the various operating procedures at the ANGB. These interviews were also used to define the areas on the ANGB where any waste materials, either intentionally or inadvertently, may have been used, spilled, stored, disposed of, or released into the environment in order to establish the source and characteristics of hazardous wastes or spills.

Historical records contained in the ANGB files were collected and reviewed to supplement the information obtained from interviews. Using the information outlined above, a list of potential waste spill/disposal/storage sites on the ANGB was identified for further evaluation. A general survey tour of the potential sites, the ANGB, and the surrounding area was conducted to determine the possible presence of visible contamination and to help the PEER survey team assess the potential for contaminant migration. Particular attention was given to locating nearby drainage ditches, surface water bodies, residences, and wells in order to establish potential pathways of the hazardous wastes or spills.

Detailed geological, hydrological, meteorological, developmental (land use and zoning), and environmental data for the area of study were also obtained from appropriate federal, state and local agencies as identified in Appendix C for the purpose of establishing receptors of hazardous waste or spills.

Using the process shown in Figure IA, a decision was then made, based on all the above information, regarding the possibility for hazardous materials contamination at any of the potential sites. If no potential for contamination existed, a decision document was implemented in order to delete the site from further consideration. If potential for contamination was identified, the potential for migration of the contaminant was assessed based on site-specific

conditions. If there was potential for contamination migration, the site was evaluated using the Hazard Assessment Rating Methodology (HARM). A discussion of the HARM system is presented in Appendix D.

II. INSTALLATION DESCRIPTION

A. LOCATION

The 128th Tactical Fighter Wing is located at Dane County Regional Airport/Truax Field, approximately five miles northeast of downtown Madison, Wisconsin. The ANGB occupies approximately 155 acres of the original 2050 acres that the Department of Army acquired by 1943. Figure IIA shows the location and boundaries of the ANGB.

B. ORGANIZATION AND HISTORY

Truax Field became operational in October 1942. Its purpose was to train radio operators and technicians for the Army Air Force. The city of Madison had built a flying field on lands used as Truax Field before Department of Defense involvement. The site consisted of approximately 1800 acres and contained 856 temporary and semi-permanent structures, which accommodated 45,000 troops and trainees. At the end of World War II, the city of Madison assumed control of the Base from the War Assets Administration.

On October 6, 1948, an Air Guard organization at Truax Field was federally recognized as the 176th Fighter Squadron, Wisconsin Air National Guard, with several supporting units. Captain Arthur C. Smith was the active organizer of the Madison units during that time.

By December 1948, the state of Wisconsin had been authorized by the National Guard Bureau to negotiate with North Central Airlines for leasing of part of the floor and hangar space at Truax Field. A lease was signed in January 1949, and the Air National Guard and North Central Airlines accommodated each other due to mutual lack of equipment and facilities. At this time F-51 "Mustangs," a C-47 (Gooney Bird), and a B-26 (Invader) were assigned to the flying units.

During 1949, contracts were let for the construction of new facilities to house the Air Guard at Truax Field, including an aircraft maintenance hangar, base supply building, and a motor pool. The hangar still functions as the

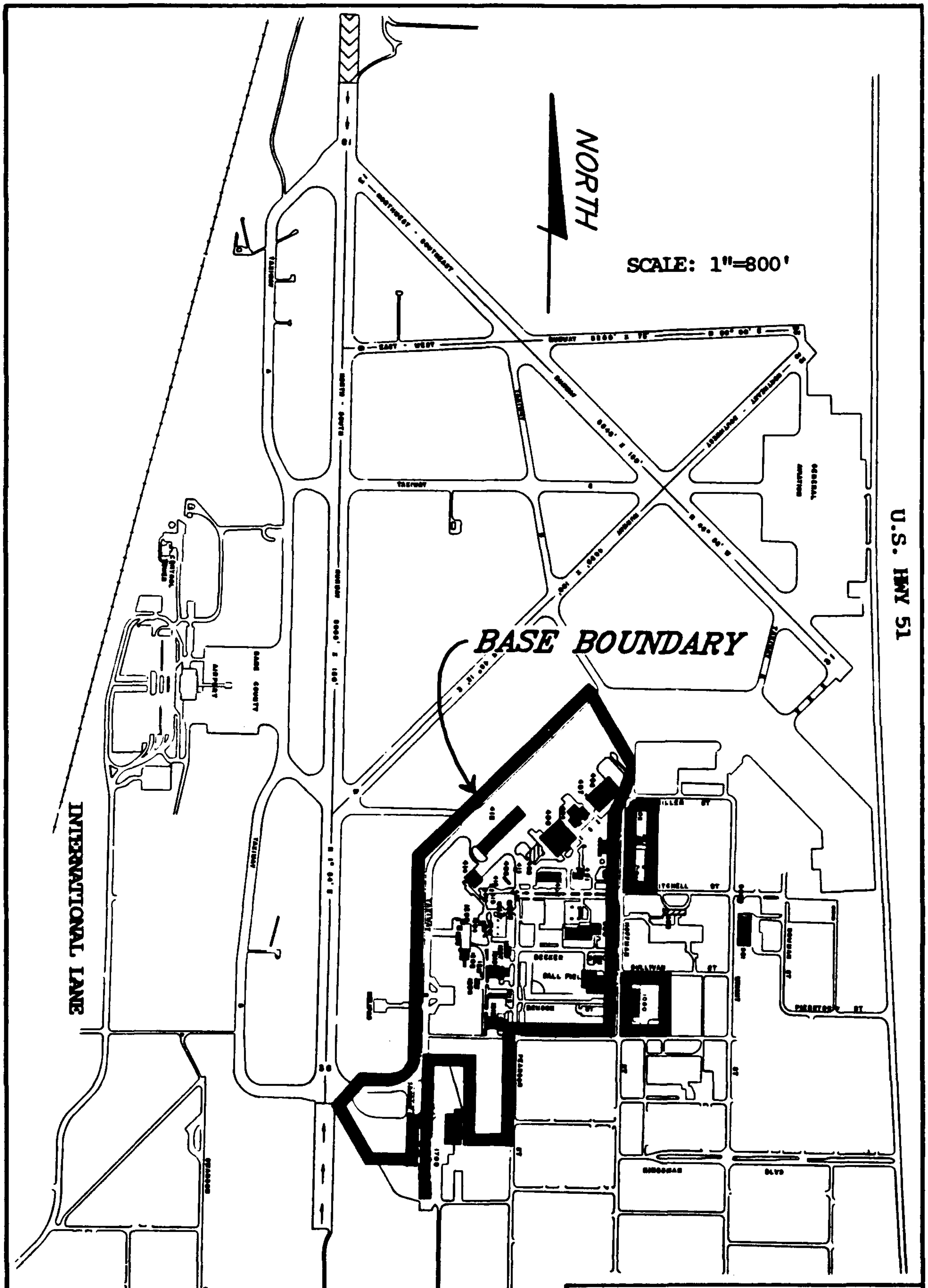

Figure IIA. LOCATION MAP
128th TFW
WISCONSIN AIR NATIONAL GUARD
TRUAX FIELD
MADISON, WISCONSIN

maintenance hangar, while the base supply building now houses the Consolidated Base Personnel Office, the Administration Office, the Base Comptroller, and others. The original motor pool is now occupied by the Aerospace Ground Equipment shop.

The 176th Fighter Squadron was recalled as a unit to active duty in February 1951, due to the Korean Conflict. After the first month of active duty, all units of the Wisconsin Air National Guard, both Madison and Milwaukee, were stationed at Truax Field. In February 1952, the first major change within the fighter squadron took place with the assignment of the F-89A Scorpion as the primary aircraft. The 176th was one of the first units to become all-weather proficient during the Korean Conflict. The period of active duty lasted until October 1952.

After returning to state status, the 176th reverted to one of the newer models of the World War II F-51 fighters. A short time later, the unit was equipped with F-86A "aircraft." By 1954, F-89s replaced the F-86s.

In 1956 the Air Guard was reorganized as the 128th Air Defense Wing with its headquarters at Truax Field. Newer models of the F-89, with nuclear capabilities, soon replaced the older models.

The Air Guard's runway alert program was begun in 1961. F-102 "Delta Daggers" replaced the F-89s in 1966. With the advent of the F-102s, regular Air Force units at Truax Field were being phased out. Only a detachment of Air Force people were to remain at Truax Field, and their mission was to operate a dispersal base. By June 1970, the Air Force had completely left Truax Field. During this phasedown, all unused buildings and land were turned over to the city of Madison.

In 1974, with the phaseout of the air defense program, the 128th Air Defense Wing was converted to the 128th Tactical Air Support Wing and began flying O-2A forward air control aircraft and A-37s.

Finally, in 1981, the Air Guard unit was converted to the 128th Tactical Fighter Wing and began flying A-10 aircraft. The service status of the 128th has not changed since 1981.

III. ENVIRONMENTAL SETTING

A. METEOROLOGY

Rainfall in Dane County, Wisconsin, averages 30.8 inches annually and snowfall averages 40.8 inches annually, based on the 30-year interval, 1951 to 1980. By calculating net precipitation according to the method outlined in the Federal Register (47 FR 31224, July 16, 1982), a net precipitation value of 0.8 inches per year is obtained. The maximum rainfall intensity, based on a 1-year frequency, 24-hour duration rainfall, is 2.25 inches (calculated according to 47 FR 31235, July 16, 1982, Figure 8).

B. GEOLOGY

1. Regional Geology

Truax Field ANGB is located adjacent to the Dane County Regional Airport/Truax Field at Madison, Wisconsin. The area is situated near the geographic center of the Central Lowlands Physiographic Province which encompasses a large portion of the central United States from western New York State to the central portions of North and South Dakota and as far south as northern Kentucky and northern Texas.

The Central Lowlands Province is characterized by mostly Paleozoic bedrock with some Cretaceous rocks underlying the western boundary. Much of this province also exhibits flat to gently inclined rock strata and widespread topographic effects of glaciation. Structurally, numerous domes and uplifts control regional dips. With the exception of the south border, the entire province is bounded by topography that is higher in elevation.

2. Local Geology

Truax Field ANGB proper lies near the western margin of the Great Lakes Section of the Central Lowlands Province. This section is

characterized by numerous lakes with associated lacustrine plains, prominent end moraines, poorly integrated drainage, and a still partially exposed cuestaform topography. Lakes Mendota to the southwest and Monona and Waubesa to the south of Truax Field exemplify this region. The ANGB is predominantly on level ground with drainage provided by man-made ditches into surrounding marsh areas.

The ANGB is considered to occupy an ancient river valley, probably the ancestral Yahara, which now lies about three miles to the northwest of the ANGB. Figure IIIA depicts a cross-sectional area from Lake Monona northward to the present-day Yahara River about 2 miles west of Truax Field ANGB. By projecting the ANGB into the cross section, one can see that the ANGB is situated over a very thick section of drift. This buried valley is filled with approximately 300 feet of glacial material (mostly sand and silt with some clay and gravel). The ancient Yahara River most likely flowed southwest into Lake Mendota. Figure IIIB shows the thickness of glacial drift in the area of Truax Field ANGB. One can see that the ANGB overlies the central portion of a thick wedge of drift. The axis of this drift trends northeast-southwest. It is believed that this is the path of the ancestral Yahara River.

Figure IIIC shows the bedrock units beneath the glacial drift. The Mount Simon Sandstone, Cambrian in age, lies under the drift section at Truax Field ANGB and is about 300 feet thick.

3. Soils

The soils present at Truax Field ANGB are represented by three series as defined by the U. S. Department of Agriculture Soil Conservation Service (Figure IIID). The Wacousta Series covers the northern one-half of the ANGB. This series consists of very poorly drained soils formed in silty sediments in depressions. The surface layer of the Wacousta Series is a black silty clay loam, approximately 14 inches

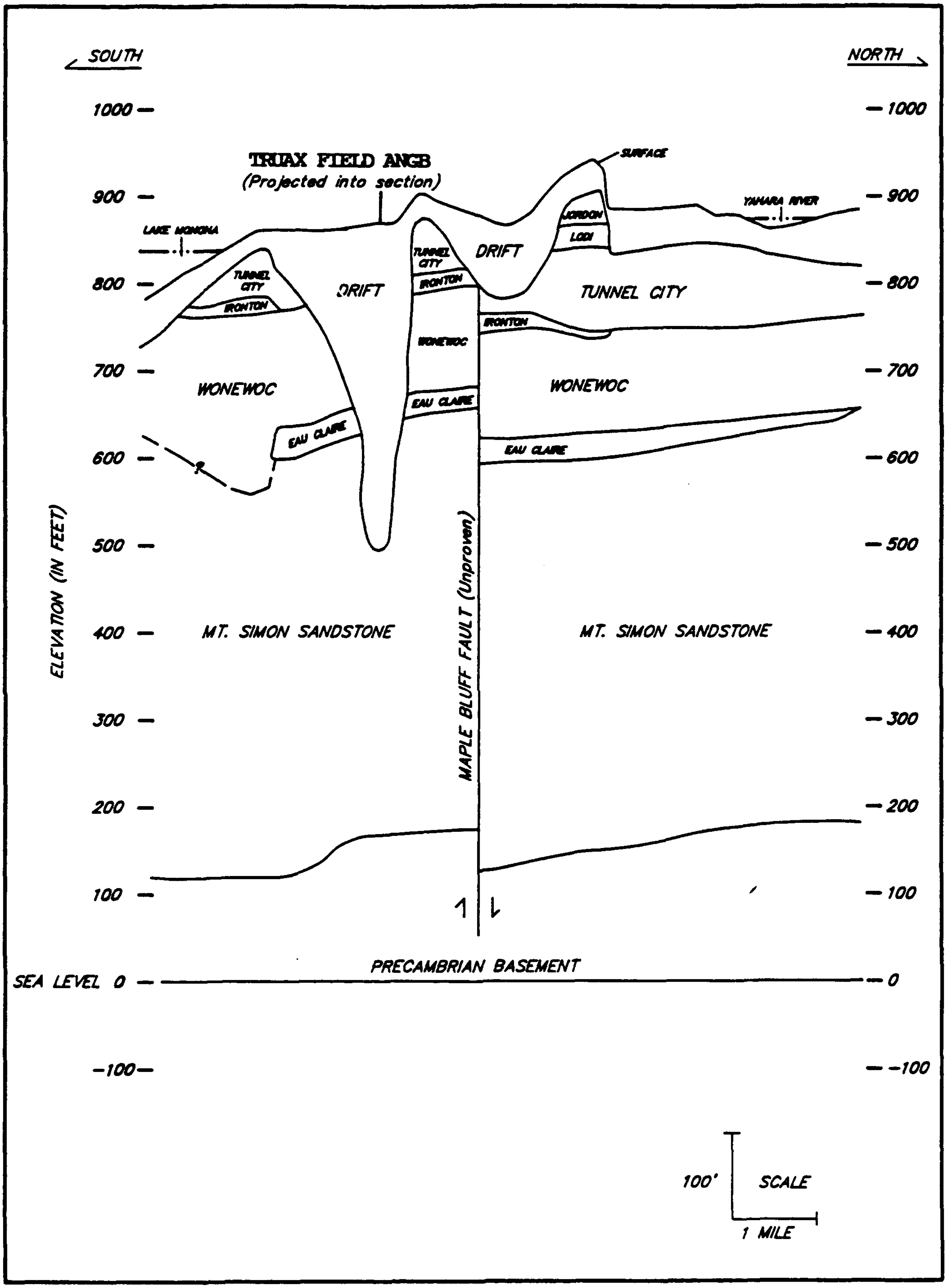

FIGURE IIIA. GEOLOGIC CROSS-SECTION,
128th TFW, WISCONSIN ANG, TRUAX FIELD, MADISON, WISCONSIN
(Source: Peters, 1988)

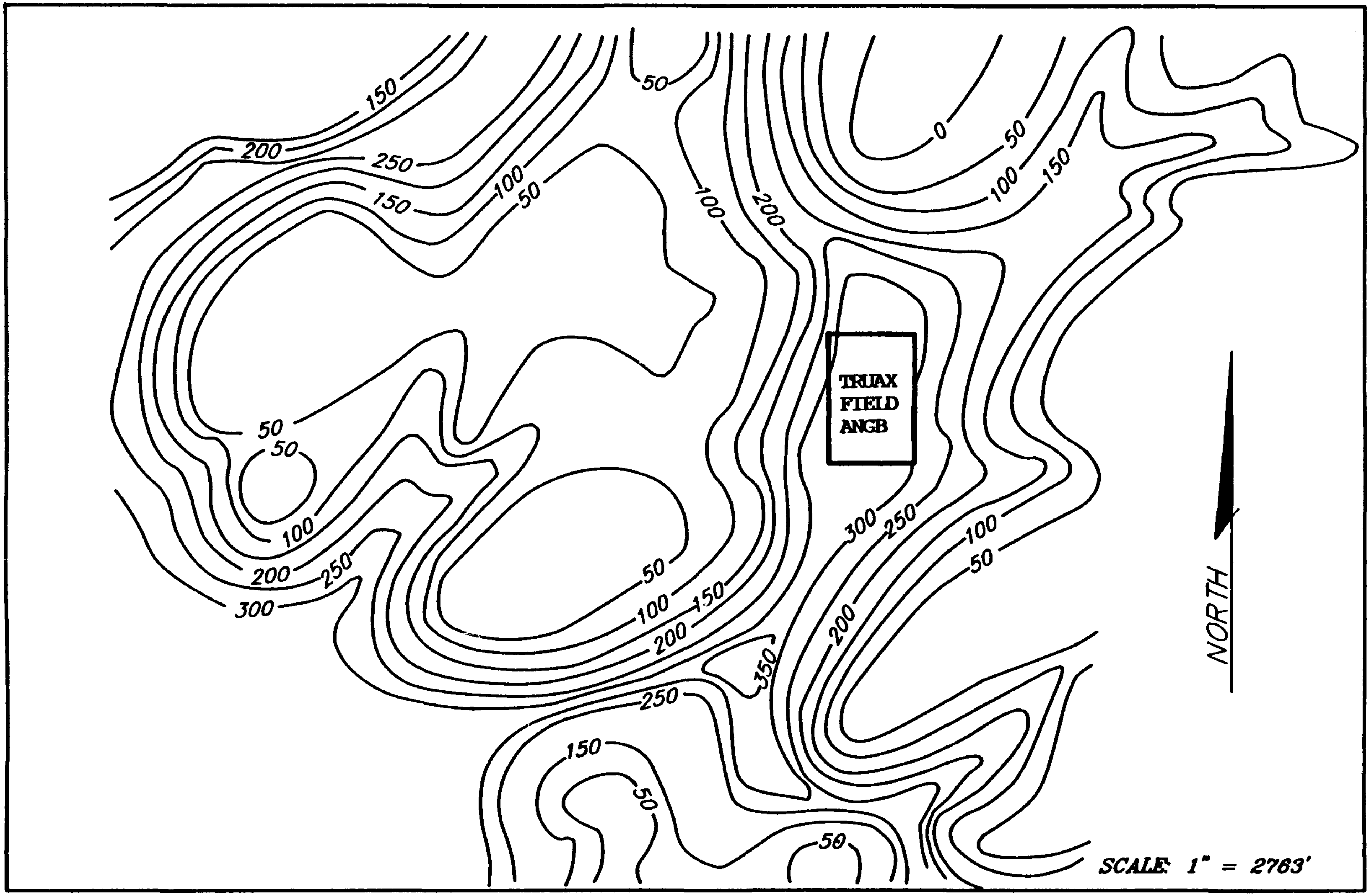

FIGURE IIIB. THICKNESS OF GLACIAL DRIFT,
128th TFW, WISCONSIN ANG, TRUAX FIELD, MADISON, WISCONSIN
(Source: Peters, 1988)

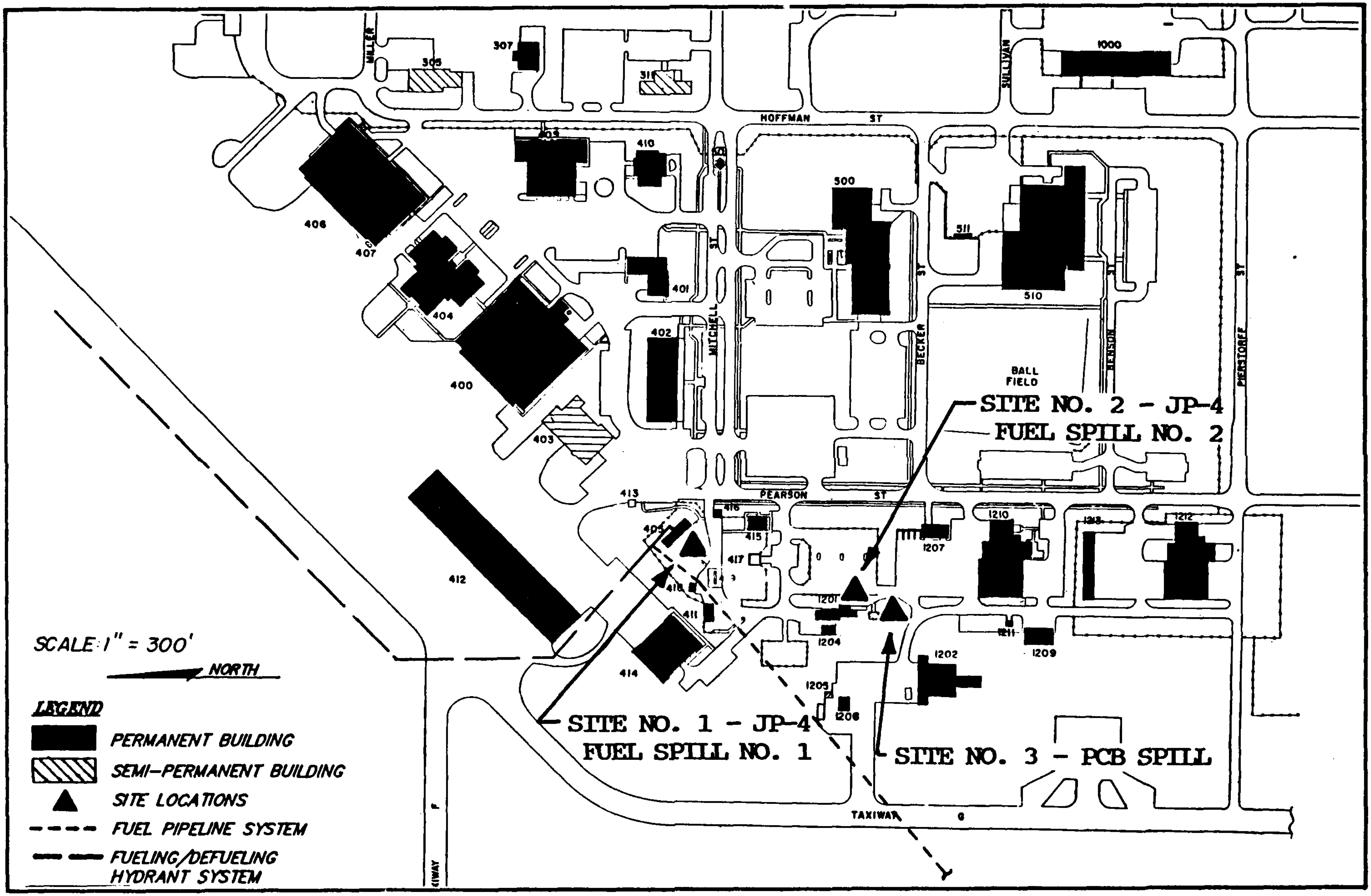

Figure IVA. LOCATION OF SITES 1, 2, AND 3.
128th TFW, WISCONSIN AIR NATIONAL GUARD, TRUAX FIELD, MADISON, WISCONSIN

Site No. 1 - JP-4 Fuel Spill No. 1 (unrated)

Four 50,000 gallon underground storage tanks (USTs) (No. 405-1, -2, -3, and -4) are located next to Building 405, the Petroleum, Oil, and Lubricant (POL) Pump House. These tanks are constructed of cathodically protected steel and have been in active use since 1952, the date of their installation. The tanks currently contain JP-4 (jet fuel) used to refuel the aircraft on base. No wastes are associated with this facility (see Appendix A).

On March 6, 1981, approximately 2,000 gallons of JP-4 spilled onto the ground when one of the 50,000 gallon USTs overflowed during a loading operation. Reportedly, an existing drainage ditch (about 100 feet long) next to the spill was dammed off. The fire department foamed the fuel and also flushed the fuel to direct it toward the ditch. The fuel soaked into the soil and was covered with straw. (Refer to Sections III.B and III.C for soil permeability and groundwater depth.) By April 9, 1981, as directed by the Madison area Department of Natural Resources, the affected soil was removed to a depth of about 6 feet in the ditch, or to the limit of odor detection on the ditch side slopes. The material was then spread at 6 to 10 inches depth on four concrete pads (used for mobile homes) that were located on what is now the parking lot west of Building 500. The contaminated soil was turned during the following summer to enhance volatilization. The next summer, 1982, the area was excavated to a depth of at least 3 feet for a parking lot. The concrete pads and contaminated soil were removed along with the excavated material and hauled off base, and the area was asphalted the same year. Because of the corrective measures taken to control contamination, the potential for additional contamination is minimal.

Site No. 2 - JP-4 Fuel Spill No. 2 (unrated)

On August 3, 1985, approximately 100 gallons of JP-4 spilled onto the ground due to a broken pipe on a transfer cart while loading used JP-4 into a waste oil storage tank (No. 1201-1, see Appendix A). All fuel was contained by diking and blotted up with absorbent blotters. The terrain in the area was

flat and the area was not adjacent to a body of water. Three 55 gallon drums of contaminated earth were removed within 2 days of the incident. Because of the corrective measures taken to control contamination, the potential for additional contamination is minimal.

Site No. 3 - PCB Spill (unrated)

Three pole-mounted transformers in an outdoor electrical training station were located next to and east of Building 1201. In 1983, one of the units was leaking dielectric fluid onto the ground approximately 4 feet below. The PCB concentration in the leaking fluid was tested and determined to be 1800 ppm. The ground area affected by the leak amounted to approximately 3 square feet. Soil samples were taken in and around the spill area; the test results indicated PCB levels from 0.3 to 31.6 ppm. A total of three 55 gallon drums of PCB-contaminated soil were removed and the area was retested for PCB contamination. The transformers were also removed to prevent further contamination. After removal, tests indicated background levels at less than 0.1 ppm. Because of the corrective measures taken to control contamination, the potential for additional contamination is minimal.

C. OTHER PERTINENT FACTS

- The wash rack area, outside and adjacent to the Main Hangar (Building 400) and Aircraft Shelter (Building 412), was used to wash aircraft until about 1983. From 1983 to the present time, washing has been conducted inside the Aircraft Shelter and occasionally inside the Main Hangar.

- During the site visitation to the Motor Pool and AGE, an apparent waste oil residue was observed on the ground around the filling ports of the associated USTs (see Appendix A). Reportedly, the residue was the result of minor spillage during filling and removing (pumping) of waste oils. There are no additional reported spills or leaks associated with these USTs.

- An abandoned fuel pipeline system and fueling/defueling hydrant system are located at the ANGB (see Appendix A). The fuel pipeline extends from an

abandoned tank farm (outside of the ANGB) to four 50,000 gallon USTs, next to the Petroleum, Oil, and Lubrication (POL) Pump House. The hydrant system line extends from the Pump House to a series of filter meter pits and hydrants, located along the edge of the flightline. The fuel pipeline system was used to supply JP-4 jet fuel and AVGAS from the tank farm to the hydrant system via the four 50,000 gallon USTs. Unused fuel was delivered from the flightline back to the 50,000 gallon USTs via a 12,000 gallon UST (see Appendix A). Both systems were installed around 1952 and remained in service until the systems were abandoned in 1973 (F-102 aircraft phased out); however, the four 50,000 gallon USTs at the Pump House have continued to be in service (fuel is transported to and from the USTs by truck and pumping).

- The area used for fire training exercises by the ANGB is located on the east side of International Avenue at Darwin Road. The site consists of a rectangular open earth area, approximately 600 by 800 feet. There is no lining or containment structure for the area. This location has been used by the ANGB since the early 1950s in conjunction with other agencies over the years for various fire training exercises. The fire training area is not located on current ANGB property. It is currently owned by Dane County. Fire training exercises have been discontinued at the site since August 1986. At that time, the director of the Dane County Municipal Airport/Truax Field ordered a halt to all training exercises until an assessment could be made as to the environmental consequences of continued training exercises.

- There are five oil/water separators located on the Base. They are associated with buildings and USTs as follows:

Building Name/No.	UST (Tank I.D. No.)
AGE Shop/401	401-1
Fire Station/403	403-2
Engine Shop/409	409-2
Fuel Cell Maintenance Shop/414	414-4
Motor Pool/1000	1000-3

All oil/water separators are presently active. The skimmings (oil and grease) from the separators flow directly to the associated USTs and the effluent flows directly to the sanitary sewer system. There are no reported incidences of major leaks or spills from the oil/water separators with the exception of occasional separator malfunctions that cause the skimmings to escape to the sanitary sewer system. The associated USTs are also listed in Appendix A.

o There are 33 USTs located on the Base. The USTs have been used to store jet fuel, gasoline, fuel oil, waste oils, diesel fuel, and detergents. Two of the USTs, one located at the AAFES Building and the other connected with the fuel hydrant system, have been abandoned. The UST at the AAFES Building has been out of service since 1953. Reportedly, this UST has been empty since that time and there have been no associated leaks or spills. The UST connected with the fuel hydrant system has been out of service since 1952, when the entire fuel hydrant system was abandoned. This UST has been empty since that time and there have been no associated leaks or spills. The remaining 31 USTs are presently active with no reported incidences of leaks or spills. Four of the active USTs are associated with Site No. 1, JP-4 Fuel Spill No. 1 (see Section IV.B). Five of the active USTs store waste oil from five oil/water separators (Tank I.D. No. 401-1, 403-2, 409-2, 414-4, and 1000-3). The USTs that store waste oils, waste solvents, etc., are periodically pumped (emptied) and disposed of through the Defense Reutilization Marketing Office. A complete list of USTs can be found in Appendix A.

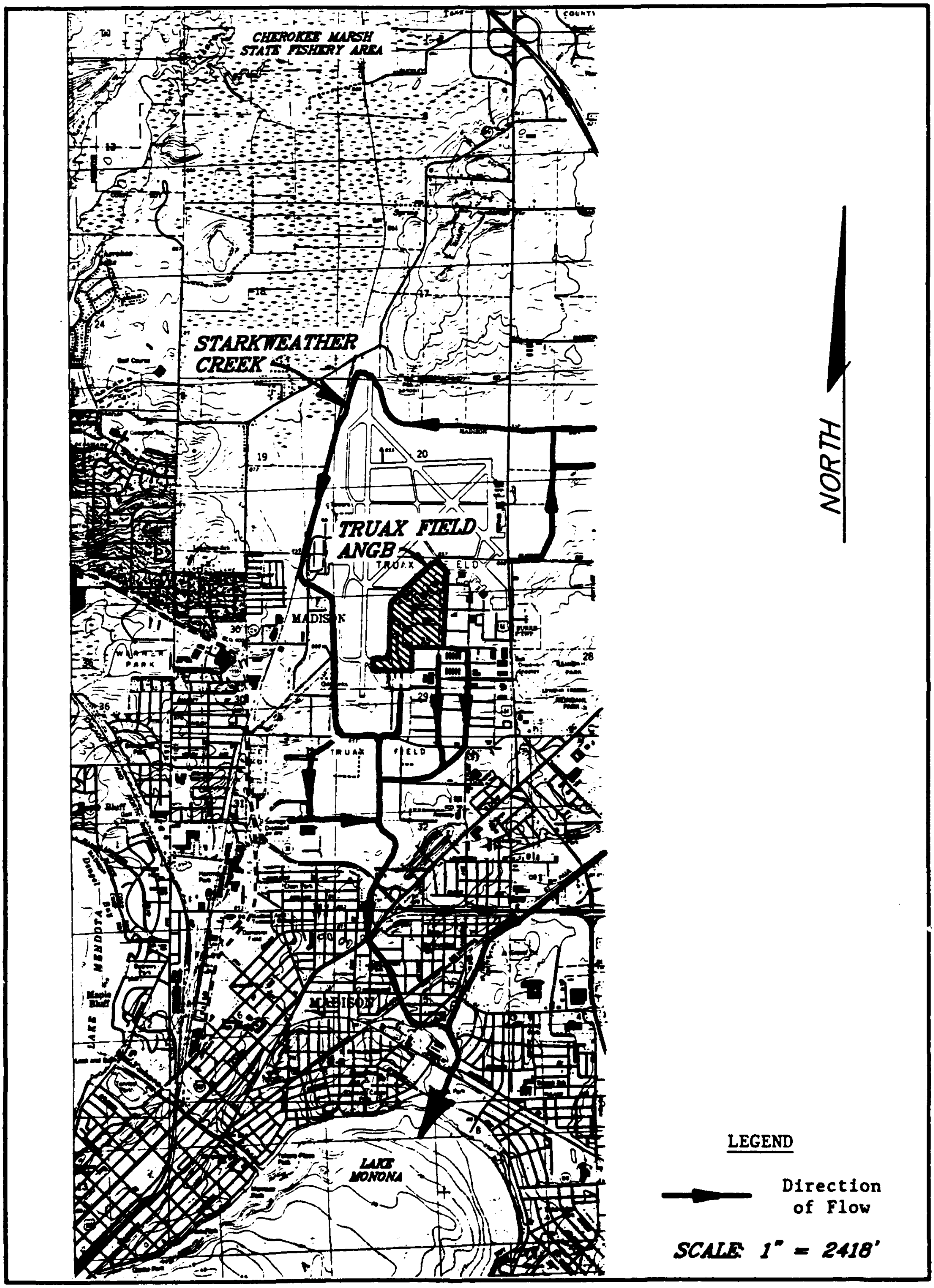

FIGURE IIIE. SURFACE DRAINAGE SYSTEM,
128th TFW, WISCONSIN ANG, TRUAX FIELD, MADISON WISCONSIN
(Source: USGS 7.5 Minute Topographic Maps; DeForest and Madison East, 1983)

has resulted in a reduction of the groundwater discharge to wetlands, lakes, and streams.

Truax Field ANGB receives all of its drinking water from the city of Madison. Likewise, all wastewater from the ANGB is carried via sanitary sewer lines to a city of Madison wastewater treatment plant. The nearest groundwater use is from five wells located outside the boundaries of the ANGB about one and a half miles southwest. Four of these wells serve the Oscar Mayer plant and are currently active. One of the wells has also served the Oscar Mayer plant and is currently inactive.

D. CRITICAL HABITATS/ENDANGERED OR THREATENED SPECIES

According to an environmental impact statement prepared for the construction of an Aircraft Engine I & R Shop and conversion of OA-37 to A-10 Beddown aircraft, there are no endangered or threatened species of flora or fauna in the vicinity of the ANGB. Cherokee Marsh, located adjacent to and north-northwest of the ANGB, contains an undisturbed fen which includes cattail marsh, sedge meadow, and wet prairie vegetation as well as providing a suitable habitat for the short-eared owl, red-tailed hawk, bobolinks, and cranes. No endangered or threatened species inhabit the marsh. Cherokee Marsh is isolated from potential contamination from Truax ANGB by Starkweather Creek which carries all drainage to Lake Monona.

IV. SITE EVALUATION

A. ACTIVITY REVIEW

A review of ANGB records and interviews with past and present ANGB employees resulted in the identification of specific operations within each activity in which most industrial chemicals are handled and hazardous wastes are generated. Table IVA summarizes the major operations associated with each activity, provides estimates of the quantities of waste currently being generated by these operations, and describes the past and present disposal practices for the wastes. If an operation is not listed in Table IVA, then that operation has been determined on a best-estimate basis to produce negligible (less than 5 gallons per year) quantities of wastes requiring ultimate disposal. For example, an activity may use small volumes of methyl ethyl ketone. Such quantities commonly evaporate during use, and therefore do not present a disposal problem. Conversely, if a particular volatile compound is listed, then the quantity shown represents an estimate of the amount actually disposed of according to the method shown. Table IVB contains building names, numbers, and addresses.

B. DISPOSAL/SPILL SITE IDENTIFICATION, EVALUATION, AND HAZARD ASSESSMENT

Interviews with 19 ANGB personnel and subsequent site inspections resulted in the identification of three disposal/spill/storage sites. It was determined that none of the identified sites posed a significant potential for environmental contamination by hazardous materials/hazardous wastes. Accordingly, none of the sites are recommended for further IRP evaluation, and were not scored by HARM. Figure IVA illustrates the locations of the three identified sites.

Table IVA. Hazardous Materials/Hazardous Wastes Disposal Summary:
128th TFW, Wisconsin Air National Guard, Truax Field, Madison, Wisconsin

Shop	Building No. (Past & Present)	Hazardous Materials/ Hazardous Waste	Estimated Quantities (Gal/Year)	Method of Treatment/Storage/Disposal* 1940 '50 '60 '70 '80 '88
Aircraft Maintenance	400			
1. Repair & Reclamation		PD-680	25	------------------FTA----------------------->'DRMO---------
		Paint Stripper	6	----------------SS/FTA---------------------->'DRMO---------
2. Electric & Battery		Battery Acid	25	--------Neutralized/SS---------------------->'DRMO---------
3. Fabrication		Paint Remover (water soluble)	12	----------------Unknown--------------------->'DRMO---------
		Aliphatic Thinner (MEK & Toluene)	36	----------------Unknown--------------------->'DRMO---------
		Lacquer Thinner (MIK)	6	----------------Unknown--------------------->'DRMO---------
		Zyglo Penetrant	48	----------------Unknown--------------------->'DRMO---------
		Emulsifier	48	----------------Unknown--------------------->'DRMO---------
		Lapping Compound	24	----------------Unknown--------------------->'DRMO---------
4. Hydraulic		Hydraulic Fluid	180	----------------Unknown--------------------->'DRMO---------
		PD-680	60	----------------Unknown--------------------->'DRMO---------
5. Photo Lab		Photographic Developer	72	-------------------SS----------------------->'DRMO---------
		Fixer	12	-------------------SS---------------------------REC---------
6. Flightline Operations		Trichloroethane	30	------------------FTA----------------------->'DRMO----------
		Carbon Cleaner	10	------------------FTA----------------------->'DRMO----------
		Strippers (MEK, MIK)	40	----------------Unknown--------------------->'DRMO----------
		JP-4 Jet Fuel	250	------------------FTA----------------------->'DRMO----------
		Engine Oil	100	------------------FTA----------------------->'DRMO----------
POL Operations	415	JP-4 Jet Fuel	120	------------------FTA----------------------->'DRMO----------
NDI Lab	307	Penetrant	25	----------------------------Unknown------->'DRMO-----------
		Developer	Unknown	----------------------------Unknown------->'DRMO-----------
		Fixer	Unknown	----------------------------Unknown------->'DRMO-----------

Table IVA (Continued). Hazardous Materials/Hazardous Wastes Disposal Summary: 128th TFW, Wisconsin Air National Guard, Truax Field, Madison, Wisconsin

Shop	Building No. (Past & Present)	Hazardous Materials/ Hazardous Waste	Estimated Quantities (Gal/Year)	Method of Treatment/Storage/Disposal* 1940 `50 `60 `70 `80 `88
Aerospace Ground Equipment Maintenance (AGE)	401	Paint Strippers/Thinners	30	----Unknown---->'DRMO----
		PD-680	50	----FTA---->'DRMO----
		Turbine Oil	10	----FTA---->'DRMO----
		Motor Oil	200	----FTA---->'DRMO----
		Gasoline	35	----FTA---->'DRMO----
		Lubrication Oil	15	----FTA---->'DRMO----
		Gear Oil	12	----Unknown---->'DRMO----
		Hydraulic Fluid	108	----Unknown---->'DRMO----
		Transmission Fluid	24	----Unknown---->'DRMO----
		Hydrochloric Acid	24	----Unknown---->'DRMO----
		Mogas (contaminated)	36	----Unknown---->'DRMO----
		JP-4 (contaminated)	36	----Unknown---->'DRMO----
Vehicle Maintenance (Motor Pool)	500,1000	PD-680	30-50	----FTA---->'DRMO----
		Sulfuric Acid	25	----Neutralize/SS---->'DRMO----
		JP-4	35-50	----FTA---->'DRMO----
		Ethylene Glycol	100	----FTA---->'DRMO----
		Lubricating Oil	15	----FTA---->'DRMO----
		Hydraulic Oil	100	----FTA---->'DRMO----
		Motor Oil	500	----FTA---->'DRMO----
		Brake Fluid	Unknown	----FTA---->'DRMO----
		Diesel Fuel	Unknown	----FTA---->'DRMO----
		Hydrochloric Acid	Unknown	----Unknown---->'DRMO----
		Bearing Grease	Unknown	----FTA---->'DRMO----
Engine	409	Carbon Remover	12	
		Jet Engine Oil	120	----FTA---->'DRMO----
		PD-680	36	----FTA---->'DRMO----
Munitions Services	406	PD-680	600	----FTA---->DRMO----
POL Operations		JP-4	150	----FTA---->DRMO----
		Tank Cleaning Sludge	10	----FTA---->DRMO----

*Legend

F.P. - Fuel Pit
F.L. - Fence Line
S.D. - Storm Drain
FTA - Fire Training Area
DRMO - Disposed of by Defense Reutilization and Marketing Office - (Before 1985 disposal was by the Defense Property Disposal Office - DPDO)
REC. - Recycle
S.S. - Sanitary Sewer
(NOTE: The FTA is located outside the boundaries of and is on property not owned by the ANGB.)

Table IVB. Building Numbers/Street Addresses
128th TFW, Wisconsin Air National Guard, Truax Field, Madison, Wisconsin

BUILDING NUMBER	BUILDING NAME	STREET ADDRESS
305	AAFES	2709 Hoffman Street
307	NDI LAB	2625 Hoffman Street
311	NCO CLUB	2401 Hoffman Street
400	MAIN HANGER	3114 Mitchell Street
401	AGE SHOP	3142 Mitchell Street
402	SEC. POLICE/COM	3110 Mitchell Street
403	FIRE STATION	3116 Mitchell Street
404	BASE OPS	3124 Mitchell Street
405	POL PUMP HOUSE	2510 Pearson Street
406	AVIONIC/WEAPON REL HANGER	3130 Mitchell Street
407	GUARD HOUSE	3112 Mitchell Street
408	GUARD HOUSE	3128 Mitchell Street
409	ENGINE SHOP	3134 Mitchell Street
410	FLIGHT SIMULATOR BUILDING	3138 Mitchell Street
411	STORAGE SHED	2506 Pearson Street
412	AIRCRAFT SHELTER	3118 Mitchell Street
414	FUEL CELL MAINTENANCE SHOP	2508 Pearson Street
415	POL OPERATIONS	2502 Pearson Street
416	GENERATOR FOR POL	2504 Pearson Street
417	LOX	2512 Pearson Street
499	LIFT STATION	3112 Mitchell Street
500	O&T	3201 Mitchell Street
501	GATEHOUSE	3202 Mitchell Street
510	BASE SUPPLY	2222 Hoffman Street
511	PAINT & DOPE STORAGE	2224 Hoffman Street
600	OFFICE BUILDING	3417 Mitchell Street
900	MISCELLANEOUS STORAGE	3501 Mitchell Street
1000	MOTOR POOL	2221 Hoffman Street
1201	BCE STORAGE	2420 Pearson Street
1202	SAND STORAGE	2320 Pearson Street
1204	BCE STORAGE	2422 Pearson Street
1205	ENGINE TEST STORAGE	2424 Pearson Street
1206	ENGINE TEST STAND	2426 Pearson Street
1207	BCE STORAGE	2314 Pearson Street
1209	BCE STORAGE	2308 Pearson Street
1210	BASE CIVIL ENG.	2310 Pearson Street
1211	BCE FUEL STORAGE	2312 Pearson Street
1212	MUNITIONS STORAGE	2202 Pearson Street
1213	MUNITIONS STORAGE SHED	2204 Pearson Street
4000	TACAN	CTH CV, Windsor

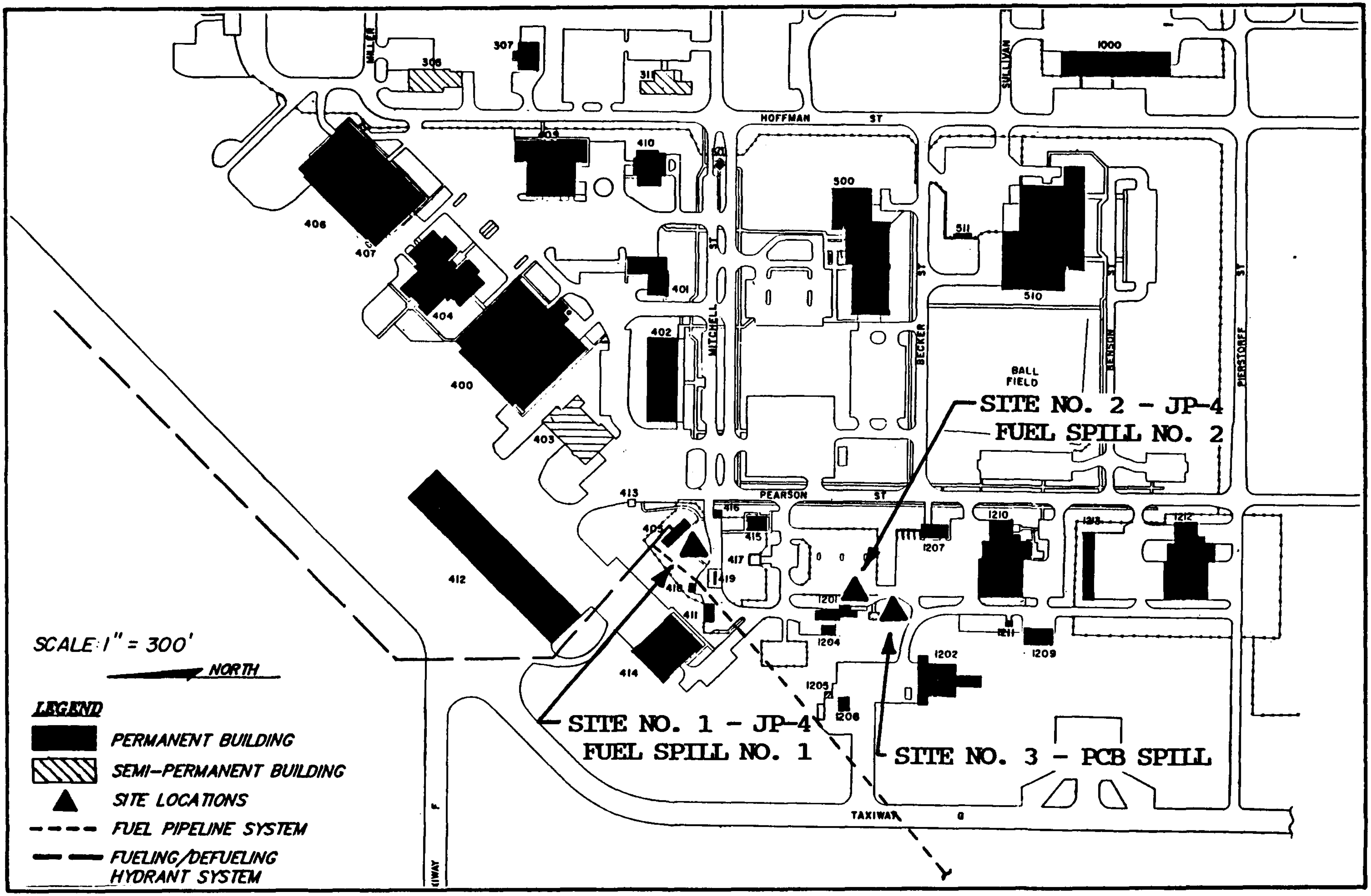

Figure IVA. LOCATION OF SITES 1, 2, AND 3.
128th TFW, WISCONSIN AIR NATIONAL GUARD, TRUAX FIELD, MADISON, WISCONSIN

Site No. 1 - JP-4 Fuel Spill No. 1 (unrated)

Four 50,000 gallon underground storage tanks (USTs) (No. 405-1, -2, -3, and -4) are located next to Building 405, the Petroleum, Oil, and Lubricant (POL) Pump House. These tanks are constructed of cathodically protected steel and have been in active use since 1952, the date of their installation. The tanks currently contain JP-4 (jet fuel) used to refuel the aircraft on base. No wastes are associated with this facility (see Appendix A).

On March 6, 1981, approximately 2,000 gallons of JP-4 spilled onto the ground when one of the 50,000 gallon USTs overflowed during a loading operation. Reportedly, an existing drainage ditch (about 100 feet long) next to the spill was dammed off. The fire department foamed the fuel and also flushed the fuel to direct it toward the ditch. The fuel soaked into the soil and was covered with straw. (Refer to Sections III.B and III.C for soil permeability and groundwater depth.) By April 9, 1981, as directed by the Madison area Department of Natural Resources, the affected soil was removed to a depth of about 6 feet in the ditch, or to the limit of odor detection on the ditch side slopes. The material was then spread at 6 to 10 inches depth on four concrete pads (used for mobile homes) that were located on what is now the parking lot west of Building 500. The contaminated soil was turned during the following summer to enhance volatilization. The next summer, 1982, the area was excavated to a depth of at least 3 feet for a parking lot. The concrete pads and contaminated soil were removed along with the excavated material and hauled off base, and the area was asphalted the same year. Because of the corrective measures taken to control contamination, the potential for additional contamination is minimal.

Site No. 2 - JP-4 Fuel Spill No. 2 (unrated)

On August 3, 1985, approximately 100 gallons of JP-4 spilled onto the ground due to a broken pipe on a transfer cart while loading used JP-4 into a waste oil storage tank (No. 1201-1, see Appendix A). All fuel was contained by diking and blotted up with absorbent blotters. The terrain in the area was

flat and the area was not adjacent to a body of water. Three 55 gallon drums of contaminated earth were removed within 2 days of the incident. Because of the corrective measures taken to control contamination, the potential for additional contamination is minimal.

Site No. 3 - PCB Spill (unrated)

Three pole-mounted transformers in an outdoor electrical training station were located next to and east of Building 1201. In 1983, one of the units was leaking dielectric fluid onto the ground approximately 4 feet below. The PCB concentration in the leaking fluid was tested and determined to be 1800 ppm. The ground area affected by the leak amounted to approximately 3 square feet. Soil samples were taken in and around the spill area; the test results indicated PCB levels from 0.3 to 31.6 ppm. A total of three 55 gallon drums of PCB-contaminated soil were removed and the area was retested for PCB contamination. The transformers were also removed to prevent further contamination. After removal, tests indicated background levels at less than 0.1 ppm. Because of the corrective measures taken to control contamination, the potential for additional contamination is minimal.

C. OTHER PERTINENT FACTS

- The wash rack area, outside and adjacent to the Main Hangar (Building 400) and Aircraft Shelter (Building 412), was used to wash aircraft until about 1983. From 1983 to the present time, washing has been conducted inside the Aircraft Shelter and occasionally inside the Main Hangar.

- During the site visitation to the Motor Pool and AGE, an apparent waste oil residue was observed on the ground around the filling ports of the associated USTs (see Appendix A). Reportedly, the residue was the result of minor spillage during filling and removing (pumping) of waste oils. There are no additional reported spills or leaks associated with these USTs.

- An abandoned fuel pipeline system and fueling/defueling hydrant system are located at the ANGB (see Appendix A). The fuel pipeline extends from an

abandoned tank farm (outside of the ANGB) to four 50,000 gallon USTs, next to the Petroleum, Oil, and Lubrication (POL) Pump House. The hydrant system line extends from the Pump House to a series of filter meter pits and hydrants, located along the edge of the flightline. The fuel pipeline system was used to supply JP-4 jet fuel and AVGAS from the tank farm to the hydrant system via the four 50,000 gallon USTs. Unused fuel was delivered from the flightline back to the 50,000 gallon USTs via a 12,000 gallon UST (see Appendix A). Both systems were installed around 1952 and remained in service until the systems were abandoned in 1973 (F-102 aircraft phased out); however, the four 50,000 gallon USTs at the Pump House have continued to be in service (fuel is transported to and from the USTs by truck and pumping).

- The area used for fire training exercises by the ANGB is located on the east side of International Avenue at Darwin Road. The site consists of a rectangular open earth area, approximately 600 by 800 feet. There is no lining or containment structure for the area. This location has been used by the ANGB since the early 1950s in conjunction with other agencies over the years for various fire training exercises. The fire training area is not located on current ANGB property. It is currently owned by Dane County. Fire training exercises have been discontinued at the site since August 1986. At that time, the director of the Dane County Municipal Airport/Truax Field ordered a halt to all training exercises until an assessment could be made as to the environmental consequences of continued training exercises.

- There are five oil/water separators located on the Base. They are associated with buildings and USTs as follows:

Building Name/No.	UST (Tank I.D. No.)
AGE Shop/401	401-1
Fire Station/403	403-2
Engine Shop/409	409-2
Fuel Cell Maintenance Shop/414	414-4
Motor Pool/1000	1000-3

All oil/water separators are presently active. The skimmings (oil and grease) from the separators flow directly to the associated USTs and the effluent flows directly to the sanitary sewer system. There are no reported incidences of major leaks or spills from the oil/water separators with the exception of occasional separator malfunctions that cause the skimmings to escape to the sanitary sewer system. The associated USTs are also listed in Appendix A.

- There are 33 USTs located on the Base. The USTs have been used to store jet fuel, gasoline, fuel oil, waste oils, diesel fuel, and detergents. Two of the USTs, one located at the AAFES Building and the other connected with the fuel hydrant system, have been abandoned. The UST at the AAFES Building has been out of service since 1953. Reportedly, this UST has been empty since that time and there have been no associated leaks or spills. The UST connected with the fuel hydrant system has been out of service since 1952, when the entire fuel hydrant system was abandoned. This UST has been empty since that time and there have been no associated leaks or spills. The remaining 31 USTs are presently active with no reported incidences of leaks or spills. Four of the active USTs are associated with Site No. 1, JP-4 Fuel Spill No. 1 (see Section IV.B). Five of the active USTs store waste oil from five oil/water separators (Tank I.D. No. 401-1, 403-2, 409-2, 414-4, and 1000-3). The USTs that store waste oils, waste solvents, etc., are periodically pumped (emptied) and disposed of through the Defense Reutilization Marketing Office. A complete list of USTs can be found in Appendix A.

V. CONCLUSIONS

As a result of information obtained through interviews with 19 current and former ANGB personnel, a review of ANGB records, and field observations, three sites have been identified as potential disposal/spill/storage sites. The three sites are as follows:

- Site No. 1 - JP-4 Fuel Spill No. 1 (unrated)
- Site No. 2 - JP-4 Fuel Spill No. 2 (unrated)
- Site No. 3 - PCB Spill (unrated)

The potential sites were eliminated from further study because they were not contaminated with hazardous materials/hazardous wastes, and a potential for migration did not exist. Therefore, they pose no significant hazards to public health or the environment. Subsequently, the sites were not rated by HARM.

VI. RECOMMENDATIONS

Based upon the findings of this report, PEER Consultants, P.C., does not consider any of the three identified sites at the ANGB as susceptible to contaminant migration or presenting a risk to public health and the environment. Therefore, implementation of further IRP evaluation is not recommended.

GLOSSARY OF TERMS

AQUIFER - A geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield economical quantities of water to wells and springs.

CONTAMINANT - As defined by Section 101(f)(33) of Superfund Amendments and Reauthorization Act of 1986 (SARA) shall include, but not be limited to any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformation in such organisms or their offspring; except that the term "contaminant" shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under:

1. any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act,

2. any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act,

3. any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress),

4. any toxic pollutant listed under Section 307(a) of the Federal Water Pollution Control Act,

5. any hazardous air pollutant listed under Section 112 of the Clean Air Act, and

6. any imminently hazardous chemical substance or mixture with respect to which the administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act;

and shall not include natural gas, liquefied natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas).

CRITICAL HABITAT - The native environment of an animal or plant which, due either to the uniqueness of the organism or the sensitivity of the environment, is susceptible to adverse reactions in response to environmental changes such as may be induced by chemical contaminants.

CUESTAFORM - Pertaining to a gently sloping plain which terminates in a steep slope on one side.

DIP - In geology, the angle at which a stratum or any planer feature is inclined from the horizontal.

DOWNGRADIENT - A direction that is hydraulically downslope, i.e., the direction in which groundwater flows.

DRIFT - Any rock material, such as boulders, till, gravel, sand, or clay, transported by a glacier and deposited by or from the ice or by or in water derived from the melting of the ice.

ENDANGERED SPECIES - Wildlife species that are designated as endangered by the U.S. Fish and Wildlife Service.

FEN - Low, swampy land.

GROUNDWATER - refers to the subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated.

HARM - Hazard Assessment Rating Methodology - A system adopted and used by the U. S. Air Force to develop and maintain a priority listing of potentially contaminated sites on installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, 11 December 1981).

HAS - Hazard Assessment Score - The score developed by using the Hazardous Assessment Rating Methodology (HARM).

HAZARDOUS MATERIAL - Any substance or mixture of substances having properties capable of producing adverse effects on the health and safety of the human being. Specific regulatory definitions also found in OSHA and DOT rules.

HAZARDOUS WASTE - A solid or liquid waste that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may

1. cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; or

2. pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

LACUSTRINE - Produced by or belonging to lakes.

HYDRAULIC CONDUCTIVITY - The rate of flow of water in gallons per day through a cross section of one square foot under a unit hydraulic gradient, at the prevailing temperature (gpd/ft^2). In the SI system, the units are m^3/day/m^2 or m/day.

HYDRAULIC GRADIENT - The rate of change in total head per unit of distance of flow in a given direction.

MIGRATION (Contaminant) - The movement of contaminants through pathways (groundwater, surface water, soil, and air).

MORAINE - Drift, deposited chiefly by direct glacial action, and having constructional topography independent of control by the surface on which the drift lies.

PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

POROSITY - The percentage of the bulk volume of a rock or soil that is occupied by interstices, whether isolated or connected.

SURFACE WATER - All water exposed at the ground surface, including streams, rivers, ponds, and lakes.

THREATENED SPECIES - Wildlife species who are designated as "Threatened" by the U.S. Fish and Wildlife Service.

TOPOGRAPHY - The general conformation of a land surface, including its relief and the position of its natural and manmade features.

WATER TABLE - The upper surface of a zone of saturation.

WETLANDS - An area subject to permanent or prolonged inundation or saturation that exhibits plant communities adapted to this environment.

WILDERNESS AREA - An area unaffected by anthropogenic activities and deemed worthy of special attention to maintain its natural condition.

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APPENDIX A

LIST OF UNDERGROUND STORAGE TANKS

APPENDIX B

RESUMES OF SEARCH TEAM MEMBERS

THOMAS S. WEBB

EDUCATION	B.S. Civil Engineering, University of Wyoming, 1966 B.A. History, Biology, University of Wyoming, 1964
CERTIFICATIONS	Certified Safety Executive - 1987 Certified Safety Manager - 1987 Certified Safety Specialist (Industrial Hygiene) - 1987 Certified Industrial Hygiene, Comprehensive Practice (Not Current) - 1975

PROFESSIONAL EXPERIENCE

1987-Present

PEER CONSULTANTS, P. C.
Oak Ridge, TN
Project Manager

Senior Project Manager presently directing these tasks: the New Boston AFS RI/FS and Robins AFB and Newark AFB Spill Prevention and Response Plans. Technical review and engineering support to DOE on Tinker AFB storm drainage system evaluation and Dover AFB, cadmium reduction in the industrial waste stream. Preliminary assessments for 13 Air National Guard Bases.

1966 - 1987

U. S. AIR FORCE

Directed the activities of the Occupational & Environmental Health Laboratory in providing consultation, technical guidance, and on-site assistance in industrial hygiene, air and water pollution, entomology, health physics, and bioenvironmental engineering at all Air Force bases in the Pacific area including Hawaii, Japan, Korea, Guam, and the Philippines. As director, developed the plans for establishing an asbestos identification and counting capability to support Air Force bases in the Pacific. Had responsibility for managing the administration and budgeting of operating funds for the organization, procurement of equipment and supplies, day-to-day supervision of laboratory personnel, and conducting selected field studies. Personnel directly supervised included chemists, engineers, medical entomologist, and specialized technicians in each functional area.

As Chief, Bioenvironmental Engineer, Headquarters US Air Force, directed the Bioenvironmental Engineering/Occupational Health programs for all Air National Guard facilities in the United States and its territories. Established policy and guidance by writing and revising Air National Guard regulations and by supplementing Air Force publications. Was the only full time certified industrial hygienist in the command and personally conducted IH surveys including asbestos identification and evaluation; also assisted in developing plans and specifications for managing or removing asbestos in Air National Guard facilities. Budgeted for and technically directed the Phase IIA Installation Restoration Program at five ANG bases. Represented the National Guard Bureau (NGB) Surgeon on the Agency Environmental Protection Committee and the NGBs on the DoD Safety and Occupational Health Policy Council. Served on DoD subcommittees and provided testimony to Congressional committees in area of expertise.

Directed the Bioenvironmental Engineering/Environmental Health program for Clark AB, John Hay AB, and Wallace AS. Evaluated community and work environments and recommended controls to keep occupational and environmental stresses within acceptable limits. Established and conducted the environmental monitoring program for Clark AB.

As the Command Bioenvironmental Engineer, Headquarters AF Reserve, developed occupational health and environmental protection plans, policy, and programs for all AF reserve bases. Also developed and taught a two week training course for all AF Reserve bioenvironmental engineering technicians.

As Chief, Bioenvironmental Engineering, Robins AFB, Georgia, conducted an industrial hygiene program for 18,000 civilian and 5,000 military workers. Performed industrial hygiene evaluations of aircraft operations, paint stripping, industrial radiography, microwave radiation, laser and other industrial facilities.

Has also served as Chief, Bioenvironmental Engineering, Hill AFB, Utah; DaNang AB, Vietnam; and Wright-Patterson AFB, Ohio.

As the bioenvironmental engineer at the above bases, conducted numerous noise surveys for determining noise levels to which base personnel were exposed. Is also thoroughly familiar with land use planning with respect to aircraft noise having conducted such evaluations for both Hill and Robins AFB. These latter evaluations generated Ldn contours for then current aircraft operations, as well as projected contours for future aircraft conversions and modifications.

As the Bioenvironmental Engineer at five Air Force bases over a period of twelve years, collected, prepared, and interpreted results from base water samples submitted for bacteriological and chemical content analysis. As Commander of Operating Location AD USAF Occupational and Environmental Health Laboratory, directly supervised analytical personnel who performed analysis of lead and other metals in water and was directly responsible for appropriate analytical procedures and accuracy of data. In addition, provided consultative services concerning health and environmental effects to bases experiencing abnormally high levels of metals in drinking water. At Wright-Patterson AFB, assisted in all environmental protection evaluations and conducted stack gas monitoring of all coal-fired heating plants on base. At Hill AFB, was one of the principal authors of the Air Force's first Environmental Impact Statements (1970-71).

PUBLICATIONS:

"Exposure to Radio Frequency Radiation from an Aircraft Radar Unit," Aviation, Space, and Environmental Medicine, November 1980

"For a Breath of Clean Air", AF Aerospace Safety Magazine, March 1975

"Baseline Industrial Shop Surveys," AF Medical Service Digest, April 1973

"Knee Problems Observed in Weapons Loading Personnel," AF Medical Service Digest, March 1970

"Lasers - A New Problem for Bioenvironmental Engineers," AF Medical Service Digest, March 1969

"Use of Iodine as a Swimming Pool Disinfectant," AF Medical Service Digest, July 1967

ANTHONY R. WAGNER

EDUCATION	B.A. Geology, University of Colorado, 1977
PROFESSIONAL EXPERIENCE	
1987-Present	PEER CONSULTANTS, P.C. Oak Ridge, TN **Geologist** Prepares preliminary assessments for Air National Guard Bases under the Installation Restoration Program (IRP), technical and research assistance on U. S. Air Force hazardous waste sites programs, location and removal of underground storage tanks, and a Remedial Investigation Report/Plan for East Fork Poplar Creek at the Y-12 Plant in Oak Ridge, Tennessee.
1987	ARDAMAN AND ASSOCIATES Sarasota, FL **Engineering Technician** Responsibilities included geologic investigations such as soil borings and analysis, auger and rotary rig drilling for subsurface investigations, hydrogeologic investigations and foundation studies.
1980-1987	EMERALD EXPLORATION CONSULTANTS, INC. Austin, TX **Senior Geologist** Project management including seismic and magnetotelluric crew supervision, seismic data processing supervision, data interpretation, technical report writing, and project proposal and budget management for government and private sector projects. Traveled extensively throughout the U.S. and China.
1978-1980	KENWILL, INC. Maryville, TN **Geologist** Responsibilities evolved around the Central Tennessee oil and gas prospect evaluation from initial planning stages through well completion, coal and mineral exploration and reserve estimation studies including surface and underground geologic mapping, and laboratory duties for quality control at a limestone mine.

PROFESSIONAL REGISTRATION	Licensed Professional Geologist, State of North Carolina - License Number 526
PROFESSIONAL MEMBERSHIPS	National Water Well Association/Association of Ground Water Scientists and Engineers
	American Association of Petroleum Geologists
	Society of Exploration Geophysicists
PUBLICATIONS	High Resolution Seismic Surveys and Their Applications to Coal Exploration and Mine Development: Case Histories, 1984, (abstract), AAPG Bull., V. 68, No. 7.
	The Application of High Resolution Seismology to the Delineation of Faulting and Coal Seam Thickness: A Continuing Case History, 1984. In Proceedings of the 1984 Rocky Mountain Coal Symposium, Bismarck, North Dakota.

KEVIN WAYNE PACK

EDUCATION	B.S. Civil Engineering, West Virginia University, 1981 Currently enrolled in the graduate Environmental Engineering Program at the University of Tennessee, Knoxville
CERTIFICATIONS	Engineer-In-Training, 1987
PROFESSIONAL EXPERIENCE	
1987-Present	PEER CONSULTANTS, P.C. Oak Ridge, TN **Civil Engineer** Prepared a preliminary assessment for the Wisconsin Air National Guard under the U. S. Air Force Installation Restoration Program, which involved identifying past spill or disposal sites posing a potential and/or actual hazard to public health and environment. Provides technical assistance on a RCRA Feasibility Investigation for East Fork Poplar Creek in Oak Ridge, Tennessee.
1984-1987	BARGE WAGGONER SUMNER AND CANNON Knoxville, TN **Civil Engineer** Involved in planning, design, and construction phases of water lines, sanitary and storm sewers, and site development. Aided in planning, reviewed vendor drawings, and prepared operation and maintenance manuals for wastewater treatment facilities.
1982-1984	TOMPKINS BECKWITH, INC. Taft, LA **Engineer** Responsibilities included resolving field installation problems, reviewing construction plans and documentation, and inspecting structural steel for Waterford III Steam Electric Station, Taft, Louisiana.
1982	DANIEL CONSTRUCTION COMPANY Fulton, MO **Engineer** Responsibilities included inspecting pipe support systems and maintaining production schedules for Calloway Nuclear Power Plant, Fulton, Missouri.

1974-1982 Summers	Technician, H. C. Nutting Geotechnical Engineers, Charleston, WV; Engineering Aide, WV Department of Natural Resources, Charleston, WV; Laborer, E. E. Moore Construction Company, South Charleston, WV.

APPENDIX C

OUTSIDE AGENCY CONTACT LIST

LIST OF UNDERGROUND STORAGE TANKS,
128th TFW, WISCONSIN ANG, TRUAX FIELD, MADISON, WISCONSIN

Tank ID. No. (Location)	Status	Date Installed	Capacity Gallons	Tank Construction	Contents	Associated Building
*305-1	Abandoned (date unknown)	1953	4,000	Bare steel	Empty	AAFES
311-1	Active	Unknown	3,300	Coated steel	Fuel Oil	NCO Club
400-1	Active	1951	15,000	Bare steel	Fuel Oil	Main Hangar
400-2	Active	1951	500	Bare steel	Fuel Oil	Main Hangar
401-1	Active	1983	550	Coated steel	Waste Oil	AGE Shop
401-2	Active	Unknown	250	Bare steel	Waste Oil	AGE Shop
403-1	Active	1951	4,000	Bare steel	Fuel Oil	Fire Station
403-2	Active	Unknown	250	Unknown	Waste Oil	Fire Station
405-1	Active	1952	50,000	Cathodically protected steel	Jet Fuel	POL Pump House
405-2	Active	1952	50,000	Cathodically protected steel	Jet Fuel	POL Pump House
405-3	Active	1952	50,000	Cathodically protected steel	Jet Fuel	POL Pump House
405-4	Active	1952	50,000	Cathodically protected steel	Jet Fuel	POL Pump House
406-1	Active	1954	8,000	Bare steel	Fuel Oil	Avionic/Weapon Hangar
409-1	Active	1981	2,000	Coated steel	Fuel Oil	Engine Shop
409-2	Active	1981	275	Coated steel	Waste Oil	Engine Shop
410-1	Active	1982	250	Coated steel	Waste Oil	Flight Simulator Bldg.
414-1	Active	1982	2,000	Fiberglass	Fuel Oil	Fuel Cell Maint. Shop
414-2	Active	1982	550	Fiberglass	Waste Solvent	Fuel Cell Maint. Shop
414-3	Active	1982	550	Fiberglass	Detergent	Fuel Cell Maint. Shop
414-4	Active	1982	550	Fiberglass	Waste Oil	Fuel Cell Maint. Shop
415-1	Active	1982	300	Bare steel	Waste Oil	POL Operations

LIST OF UNDERGROUND STORAGE TANKS,
128th TFW, WISCONSIN ANG, TRUAX FIELD, MADISON, WISCONSIN (Continued)

Tank ID. No. (Location)	Status	Date Installed	Capacity Gallons	Tank Construction	Contents	Associated Building
901-1	Active	1959	10,000	Bare steel	Fuel Oil	N/A
1000-1	Active	1975	12,000	Bare steel	Unleaded Gasoline	Motor Pool
1000-2	Active	1975	6,000	Bare steel	Diesel	Motor Pool
1000-3	Active	1975	275	Bare steel	Waste Oil	Motor Pool
1000-4	Active	Unknown	2,000	Bare steel	Fuel Oil	Motor Pool
1000-5	Active	Unknown	250	Bare steel	Waste Oil	Motor Pool
1201-1	Active	Unknown	3,000	Bare steel	Waste Oil	BCE Storage
1209-1	Active	1985	200	Coated steel	Leaded Gasoline	BCE Storage
1210-1	Active	1956	1,500	Bare steel	Fuel Oil	Base Civil Engineering
1210-2	Active	1985	300	Coated steel	Waste Oil	Base Civil Engineering
1212-1	Active	1957	1,500	Bare steel	Fuel Oil	Munitions Storage
* N/A	Abandoned	1952	12,000	Steel	Empty	Fuel Hydrant System/ Flightline
* Fuel Hydrant System	Abandoned	1952	N/A	Steel	Empty	POL Pump House/ Flightline
* Fuel Pipeline System	Abandoned	1952	N/A	Steel	Empty	POL Pump House

*See Section IV. C, Other Pertinent Facts

OUTSIDE AGENCY CONTACT LIST

1. State Laboratory of Hygiene
   465 Henry Matt
   Madison, Wisconsin 53706

2. Wisconsin Geological Survey
   3817 Mineral Point Road
   Madison, Wisconsin 53705

3. State of Wisconsin
   Department of Natural Resources
   3911 Fish Hatchery Road
   Madison, Wisconsin 53711

4. U. S. Geological Survey - Water Resources
   6417 Normandy Lane
   Madison, Wisconsin 53706

5. City of Madison Engineering Division
   210 Martin Luther King, Jr., Blvd.
   Madison, Wisconsin 53710

6. Dane County Regional Airport
   Truax Field
   4000 International Lane
   Madison, Wisconsin 53704

7. Defense Reutilization and Marketing Office (DRMO)
   Building 2184
   Fort McCoy
   Sparta, Wisconsin 54656

8. Department of the Army
   St. Paul District, Corps of Engineers
   1135 U. S. Post Office & Custom House
   St. Paul, Minnesota 55101-1479

APPENDIX D

USAF HAZARD ASSESSMENT RATING METHODOLOGY

USAF HAZARD ASSESSMENT RATING METHODOLOGY

The Department of Defense (DoD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DoD facilities. One of the actions required under this program is to:

> develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the U. S. Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Preliminary Assessment phase of its Installation Restoration Program (IRP).

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air National Guard in setting priorities for follow-on site investigations.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD program needs.

The model uses data readily obtained during the Preliminary Assessment portion (Phase I) of the IRP. Scoring judgment and computations are easily made. In

assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards. This approach meshes well with the policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flowchart (Figure 1A of this report). The site rating form and the rating factor guideline are provided at the end of this appendix.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: (1) possible receptors of the contamination, (2) the waste and its characteristics, (3) the potential pathways for contamination migration, and (4) any efforts that were made to contain the wastes resulting from a spill.

The receptors category rating is based on four rating factors: (1) the potential for human exposure to the site, (2) the potential for human ingestion of contaminants should underlying aquifers be polluted, (3) the current and anticipated uses of the surrounding area, and (4) the potential for adverse effects upon important biological resources and fragile natural settings. The potential for human exposure is evaluated on the basis of the total population within 1,000 feet of the site, and the distance between the site and the base boundary. The potential for human ingestion of contaminants is based on the distance between the site and the nearest well, the groundwater use of the uppermost aquifer, and population served by the groundwater supply within 3 miles of the site. The uses of the surrounding area are determined by the zoning within a 1-mile radius. Determination of whether or not critical environments exist within a 1-mile radius of the site predicts the potential for adverse effects from the site upon important biological resources and fragile natural settings. Each rating factor is numerically evaluated (0-3) and increased by a multiplier. The maximum possible score is also computed. The factor score and maximum possible scores are totaled, and the receptors

subscore computed as follows: receptors subscore = (100 x factor score subtotal/maximum score subtotal).

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways: surface-water migration, flooding, and groundwater migration. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned, and for direct evidence, 100 points are assigned. If no evidence is found, the highest score among the three possible routes is used. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The scores for each of the three categories are added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites with no contaminant are not reduced. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factory to the sum of the scores for the other three categories.

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE ______________________________

LOCATION ______________________________

DATE OF OPERATION OR OCCURRENCE ______________________________

OWNER/OPERATOR ______________________________

COMMENTS/DESCRIPTION ______________________________

SITE RATED BY ______________________________

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 ft. of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to installation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Groundwater use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by groundwater supply within 3 miles of site		6		

Subtotals ______ ______

Receptors subscore (100 x factor score subtotal/maximum score subtotal) ______

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) ______
2. Confidence level (C = confirmed, S = suspected) ______
3. Hazard rating (H = high, M = medium, L = low) ______

Factor Subscore A (from 20 to 100 based on factor score matrix) ______

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

__________ x __________ = __________

C. Apply physical state multiplier
Subscore B x Physical State Multiplier = Waste Characteristics Subscore

__________ x __________ = __________

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore ______

B. Rate the migration potential for 3 potential pathways: Surface water migration, flooding, and groundwater migration. Select the highest rating, and proceed to C.

1. Surface water migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
Subtotals			_____	_____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

2. Flooding

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Flooding		1		

Subscore (100 x factor score/3) _____

3. Groundwater migration

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
Depth to groundwater		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to groundwater		8		
Subtotals			_____	_____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors _____
Waste Characteristics _____
Pathways _____

Total _____ divided by 3 = _____
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

__________ x __________ = [ ]

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

	Rating Factors	Rating Scale Levels 0	1	2	3	Multiplier
A.	Population within 1,000 feet (includes on-base facilities)	0	1-25	26-100	Greater than 100	4
B.	Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C.	Land use/zoning (within 1-mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or Industrial	Residential	3
D.	Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	6
E.	Critical environments (within 1-mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands	10
F.	Water quality/use designation of nearest surface water body	Agricultural or industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	6
G.	Groundwater use of uppermost aquifer	Not used, other sources readily available	Commercial industrial, or irrigation, very limited other water sources	Drinking water, municipal water available	Drinking water, no municipal water available, commercial, industrial, or irrigation; no other water source available	9
H.	Population served by surface water supplies within 3 miles downstream of site	0	1-15	51-1,000	Greater than 1,000	6
I.	Population served by aquifer supplies within 3 miles of site	0	1-50	51-1,000	Greater than 1,000	6

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records
- o Knowledge of types and quantities of wastes generated by shops and other areas on base

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

A-3 Hazard Rating

Rating Factors	Rating Scale Levels 0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability, and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

II. **WASTE CHARACTERISTICS**--Continued

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
	L	C	M
80	M	C	H
70	L	S	H
	S	C	H
60	M	C	M
	L	S	M
	L	C	L
50	M	S	H
	S	C	M
	S	S	H
	M	S	M
40	M	C	L
	L	S	L
	S	C	L
30	M	S	L
	S	S	M
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:

Confidence Level

- o Confirmed confidence levels (C) can be added.
- o Suspected confidence levels (S) can be added.
- o Confirmed confidence levels cannot be added with suspected confidence levels.

Waste Hazard Rating

- o Wastes with the same hazard rating can be added.
- o Wastes with different hazard ratings can only be added in a downgrade mode, e.g., MCM + SCH = LCM if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

B. **Persistence Multiplier for Point Rating**

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. **Physical State Multiplier**

Physical state	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, groundwater, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 Potential for Surface Water Contamination

Rating Factors	0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to a mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($>10^{-6}$ cm/sec)	6
Rainfall intensity based on 1-year, 24 hour rainfall (thunderstorms)	<1.0 inch 0-5 0	1.0 to 2.0 inches 6-35 30	2.1 to 3.0 inches 36-49 60	>3.0 inches >50 100	8

B-2 Potential for Flooding

Rating Factors	0	1	2	3	Multiplier
Floodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	Floods annually	1

B-3 Potential for Groundwater Contamination

Rating Factors	0	1	2	3	Multiplier
Depth to groundwater	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay 10^{-2} to 10^{-4} cm/sec	0% to 15% clay ($<10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high groundwater level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean groundwater level	8
Direct access to groundwater (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk	Low risk	Moderate risk	High risk	8

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. Waste Management Practices Factor

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Protection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1, or III-6-3, then leave blank for calculation of factor score and maximum possible score.